

DOCUMENT RESUME

ED 305 519

CE 052 275

AUTHOR Ruth, Gloria A.
TITLE A Systems Approach to Cost-Benefit Analysis. Training & Development Research Report.
INSTITUTION Ohio State Univ., Columbus. Coll. of Education.
PUB DATE Oct 85
NOTE 16p.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Adult Education; *Cost Effectiveness; *Evaluation Methods; *Models; Needs Assessment; *On the Job Training; *Staff Development; *Systems Approach
IDENTIFIERS *Anchor Hocking Corporation; Return on Investment

ABSTRACT

Training managers increasingly are being asked to document the cost effectiveness of their programs. A cost-benefit analysis program was implemented at the Anchor Hocking Corporation that may be useful for other organizations. The cost-benefit analysis at Anchor Hocking is part of the training system design. The complete training system design model includes the following: (1) needs identification/forecasting; (2) needs analysis; (3) anticipated cost-benefit evaluation; (4) performance objectives and savings base design; (5) data gathering; (6) course design; (7) implementation of training; (8) data gathering; (9) on-the-floor follow-up; (10) actual return-on-investment calculation; and (11) retraining/revision. Although these steps are listed chronologically, they are often performed simultaneously. This approach has worked well for Anchor Hocking, and components of the model can be used by other organizations to develop their own cost-benefit analysis. (KC)

* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *

A Systems Approach to Cost-Benefit Analysis

Gloria A. Ruth

TRAINING & DEVELOPMENT RESEARCH REPORT

Graduate Program in Training & Development
Department of Educational Policy & Leadership
The Ohio State University

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)

- ☒ This document has been reproduced as
received from the person or organization
originating it.
- ☐ Minor changes have been made to improve
reproduction quality.

- Points of view or opinions stated in this docu-
ment do not necessarily represent official
OERI position or policy.

"PERMISSION TO REPRODUCE THIS
MATERIAL HAS BEEN GRANTED BY

R. Jacobs

TO THE EDUCATIONAL RESOURCES
INFORMATION CENTER (ERIC)."

October 1985

EDITOR'S PREFACE

This research report by Gloria Ruth is a unique piece of work. She has addressed a very important and oftentimes perplexing aspect of our field, cost-benefit analysis, with extraordinary balance. Gloria has presented this topic with the clarity and insight of a practitioner while maintaining the curiosity of an accomplished researcher. This combination has resulted in an easily understood and informative description of the Anchor Hocking approach to cost-benefit analysis.

There are a number of activities in the training and development field that may seem out of our professional reach to accomplish. They appear feasible from descriptions in the training literature, but are difficult to implement in real settings. Cost-benefit analysis is one prominent example. This research report, however, describes a real-life example that works, although it must be noted that the system described took two years to design and install. The author, and her company, believe strongly that the time was well invested. We encourage others who have been successful in documenting the value of training to share their experiences through this Training and Development Research Report series. We are waiting to hear from you.

Ronald L. Jacobs, Ph.D.

Graduate Program in Training and Development

Educational Policy and Leadership

The Ohio State University

Columbus, Ohio 43210

A Systems Approach to Cost-Benefit Analysis

The topics of cost-benefit analysis and return-on-investment have been prominent in the training and development field. The basic reason for this increased interest seems self-evident. Many of us in training management positions are being requested to provide documented evidence that our programs are resulting in desirable returns for the organization. As most of us realize, documenting the benefits of training and development can be a very frustrating challenge. This paper describes a cost-benefit program now being implemented at the Anchor Hocking Corporation. Our approach isn't the only approach to conducting a cost-benefit analysis, but it has worked in my organization, and may for yours as well.

I would initially like to address two assumptions related to cost-benefit analysis. First, many of us suffer from the assumption that you have to become a member of the great alliance of "bean counters" to do cost-benefit analysis. Some accounting skills may be helpful, but cost-benefit analysis is, at the bottom line, just common sense. Second, cost-benefit analysis may have a negative connotation for most of us. Many times we are requested to provide cost-benefit information under uncertain organizational expectations. Cost-benefit analysis is, however, simply a matter of comparing training costs to training benefits. Documenting the benefits of training is important to our organizations and as well as to ourselves, as professionals in the training and development field. We are part of what makes our organizations profitable.

The Approach at Anchor Hocking Corporation

As testimony to the success of this approach, recently our general manager was giving serious consideration to eliminating the training department as a cost-saving measure. Before he even talked to me as training manager about this possibility, I was able to send him a memorandum indicating that I realized he was considering this action and also presenting a list of reasons why this should not occur. The list included the returns-on-investment we had documented during the previous year.

What was the result? My divisional training program was viewed as being too valuable to eliminate. In fact, because we could show a documented increase in productivity, we had received requests from other divisions to design similar training programs. Instead of elimination, the training program was transferred to the corporate level. Our responsibilities and mission were expanded, and I was appointed manager of corporate training. I sincerely believe that our efforts to track and report the return on our training investments were the key element in saving the training program at Anchor Hocking.

Our cost-benefit analysis approach is part of our training system design. Briefly, our complete training system design model includes the following:

1. Needs identification/forecasting,
2. Needs analysis,
3. Anticipated cost-benefit evaluation,
4. Performance objectives and savings base design,
5. Data gathering,

6. Course design,
7. Implementation of training,
8. Data gathering,
9. On-the-floor follow-up,
10. Actual return-on-investment calculation,
11. Retraining/revision.

These steps are presented in chronological order, but often are performed simultaneously. In this paper, I will describe each step as it relates to determining the cost-benefits of a specific training program.

Step 1. Needs Identification/Forecasting

We start with needs identification/forecasting which is the systematic monitoring of an organization's plans and objectives. This process is used to determine whether the actual outputs match business objectives, both current and future. When mismatches are identified between actual organizational performance and desired performance, we then use a traditional needs assessment approach to further understand those discrepancies.

At the 22nd Annual Conference of the National Society for Performance and Instruction, Edwin Thomas of the U.S. Department of Agriculture, presented a paper declaring his belief that training managers must take responsibility for needs identification in their organizations. This proactive stance helps them have greater control over the use of training resources. He further suggests that managers should "tune-in to organizational events, conditions, and changes." The needs identification or forecasting system we use is consistent

with this view.

Our needs identification/forecasting step is conducted in the following manner. With help from our data processing department, we analyze existing personnel, operations, and organizational development reports to locate any data that would provide "clues" to possible training needs. Some of the information we analyze includes: retirement reports, add-to-staff requests, absenteeism and tardiness reports, accident reports, worker's compensation claims, turnover statistics, union grievance histories, and apprenticeship records. This information is reformatted specifically for our use and then separated by department and job classification, where possible. Critical limits are set so that an "exception" report can also be generated.

For example, we can determine for each job classification, an ideal crewing level, compare that level against new hires, and determine retirements and other occupational loss statistics. In this way, we can be forewarned when a critical number of staff are lost to a department, possibly indicating a potential need for training. Absenteeism, accident rates, and other personnel problems are also monitored so that significant increases can be investigated for human performance problems.

In addition to personnel records, we also monitor information obtained from operating reports. For example, we compare material budgets by department to material-scrap reports to analyze which areas may be wasting resources or engaging in excessive rework. Probably the most important tool that we have for identifying human performance

problems is a weekly productivity report, sometimes referred to as a "statistical quality control system." In each of our departments, every manager and supervisor prepares a productivity plan--the amount of output he/she feels can be obtained within a set period of time. This plan is compared to actual outputs on a daily basis and the variances from that plan are summarized on a weekly basis. Variances stated in terms of man-hours lost are not only reported by department, but are categorized in detail by their cause. These categories provide valuable information for measuring the effects of training. Lost man-hours can easily be translated into costs or cost-savings. This reporting system has been extremely helpful in forecasting training, but it is not a necessary pre-condition for establishing a formal forecasting system.

We also pay close attention to organizational development plans which may identify a future training need. Specifically, this means examining business objectives and strategic plans, monitoring capital asset budgets and engineering projects for new equipment purchases, and determining when new methods which require training will be introduced. This system does not mean that our training programs are not also responsive to "felt needs." We do not rely on management as the sole source for training requests. The training department can identify a potential performance problem themselves.

Training projects are initiated through a Program Proposal Form. This form requires the identification of dollar loss and a clear identification of probable performance problems. The form also provides an opportunity for the later reporting of the results of both

the needs and cost-benefit analyses. As I mentioned, our forecasting method alters the traditional role of the training department so that it becomes a "productivity watchdog" for the organization and is proactive rather than reactive. This step is vital to our cost-benefit analysis because our forecasting system tends to focus on those areas where dollar loss has been identified.

Step 2. Needs Analysis

Once a performance problem has been identified, the next step is to conduct a needs analysis. Is the observed problem (e.g., dollar loss, increased turnover, number of scrap or rework) actually related to a knowledge/skill deficiency? Our initial step of forecasting sometimes helps us identify the cause of the problem. Our assumption is that a lack of desired performance, or failure to attain an objective is probably due to one of five "M's": Manpower, Methods, Machine, Motivation, or Money (resources). We act as in-house productivity consultants in identifying these causes and will use training as an intervention only if the problem stems from a lack of knowledge or skill. We rely on Robert Mager's rule that it is not a training problem if "they could do it if their lives depended on it." Because of this, the training department often puts itself out of business. We have even turned down requests when training was not the appropriate remedy.

Step 3. Cost-Benefit Analysis

Our third step is to conduct the cost-benefit analysis. Greg Kearsely (1982) has describes several models of cost-benefit-analysis. One of these is the productivity improvement model. He states, "to

improve productivity, costs or resources must be reduced at the same time training results are increased" (p. 17). One measure of efficiency is return-on-investment, or R.O.I. The calculation of R.O.I is as follows:

$$\text{R.O.I.} = \frac{\text{RESULTS}}{\text{INVESTMENTS}}$$

Using this formula, any R.O.I. greater than one means that you are getting more return than you invested. An R.O.I. equal to one means that you are getting a return equal to the investment. What is not simple in this calculation is gathering the data necessary to evaluate R.O.I. The numbers in each part of the R.O.I. formula represent must be determined. Many times we must rely on the our best professional prediction about what these might be. The next step enables us to predict the meaning of RESULTS and INVESTMENTS as parts of the formula.

Step 4 Performance Objectives/Savings Base Design

We begin this step by identifying a savings base. A savings base is any measurable variable which can be affected by training and then translated into costs saved. Savings bases are often identified in the forecasting step, and are, in effect, the performance objectives. That is, they are the behaviors which have been identified as contributing to dollar losses and are the target of

change through training.

For example, in the case of our glass forming operators, we observed through our forecasting system that their productivity was steadily decreasing. Part of this problem had been caused by a loss of skilled operators through retirements and turnover. The newer operators had not been trained sufficiently since the shortage of skilled operators reduced the effectiveness of the apprenticeship process. For example, the operators were responsible for obtaining the correct glass temperature as it passed through the furnace. The temperature of the furnace is controlled by increasing or decreasing the burner fire. In the process of our analysis, we discovered that there were dampers that could also be used to control the furnace temperature. Technical manuals that described how to use the dampers had been misplaced because of the turnover of skilled operators. The operators were unknowingly doing the equivalent of heating the house with the windows open.

We estimated the current energy cost which could be saved by training the operators to use the dampers at the lower, correct temperature. This became a primary savings base and one of the performance objectives of the first module of the "Forming Operator's Training Program." It formed a substantial part of our best professional guess about the return we should get from our training investment.

We were also conscious of the fact that we had more than one performance objective for the program. We assumed that the training program would also improve operator performance by at least 5 per

cent. Consequently, the second savings-base measured was their overall performance improvement and its affect on productivity. This was measured by "per cent of pack," which is the number of acceptable pieces of glassware packed for sale versus the potential number of pieces produced. We estimated a one per cent increase in this measure was worth a specific cost amount (with the aid of the cost accounting department) and added these two bases to obtain our total estimated results.

Once we have determined the savings bases, we can then compare that figure against anticipated program production costs. These may vary depending on the delivery methods used, number of people participating in the program, salary rate, the length and difficulty of the program, and others. This provides us with the "investment" portion of our expected R.O.I. calculation. After the calculations have been conducted for each potential training program, the program proposals are rank-ordered according to their estimated R.O.I. The proposals are then submitted to our Executive Training Committee, composed of our division-level general managers or their appointed substitute. Using the information gathered by the training staff and our recommendations, the committee approves a schedule of training program development.

Occasions arise, of course, when the decision to develop a training program cannot be made strictly on the basis of R.O.I. For example, determining R.O.I. is difficult for management training because of its indirect relationship to actual outputs. Some indications can be obtained based on measures such as turnover rates

under each supervisor, the number of requests for transfers, or department productivity level. In the case of new technology or company procedures, predicting a reliable R.O.I is also difficult because of a lack of history. In these instances, the Executive Training Committee may agree to override the cost-benefit rank ordering, but this places the responsibility for making the program development decision directly on management. Actual returns gained on other, more measurable human performance problems, usually support those that cannot be measured as accurately.

Step 5 Data Gathering

Once the training program has been developed, then the savings base measure can become a handy evaluation tool. Before each program is actually implemented, individual performance records (IPRs), which are built upon the savings base, are recorded for a period of approximately ninety days. These records document trainee performance on a daily basis and are installed as permanent and continuous measures of performance.

Steps 6, 7, 8, & 9 Course Design, Implementation, Data Gathering, and

On-the-floor Follow-up

After the training course has been approved, designed, and implemented, the IPRs allow us to identify individuals who may require retraining and also provide a vehicle for our in-plant training specialists to do on-the-floor follow-ups with supervisors. This follow-up procedure is conducted to ensure the transfer of learning for the trainees and their supervisors. The training specialists work with the supervisors on completing the follow-up activities with their

workers, providing positive and corrective feedback, and using problem solving skills to investigate future performance/productivity problems.

Step 10 Actual Return-On-Investment Calculation

The IPR provides us with a means to judge actual return-on-investment after the course has been implemented and the trainees are back on the job. It tells us how successful the program was in general and identifies areas that require remediation. Because the IPR is a continuous measure, we can calculate results upon request. We make a more formal report to the Executive Training Committee at budget-request time. This reporting structure also provides us with a means of continuously advertising the success of our training programs.

Final Comments

Cost-benefit analysis is an issue of great importance for training and development professionals. Varying approaches can be taken to address this issue. Our approach may appear to be overly complex, overly simplistic, too good to be true, or even unrealistic. These opinions may all be true to some degree, but our approach seems to work well for us. Our approach may not work in all settings, but I hope you will be able to incorporate components of our approach to develop a model that suits your organizationn.

BIBLIOGRAPHY

- Kaufman, R. (1976). Identifying and solving problems:
A systems approach . San Diego, CA: University Associates.
- Kaufman, R., and Stone, B. (1983). Planning for organizational success .
New York: John Wiley & Sons.
- Kearsley, G. (1982). Costs, benefits, and productivity in
training systems . Reading, PA: Addison-Wesley.
- Nichols, F. (December, 1979). Finding the bottom-line payment for
training.
Training and Development Journal , pp. 53-54.
- Odiorne, G. (June, 1979). The need for an economic approach to training.
Training and Development Journal , pp. 32-40.
- Phillips, J. (1983). Handbook of training evaluation and measurement
methods . Houston: Gulf Publishing, Co.
- Spencer, L. (July, 1984). How to calculate the costs and benefits
of an HRD program. Training , pp. .
- Suessmuth, P. (1981) A rule of thumb way to determine quickly the real
cost of any training program. In R. Zemke, et al.,
Designing cost-effective training--and measuring the results ,
Minneapolis, MN: Lakewood Publications.

At the time this research report was prepared, Dr. Gloria Ruth was Corporate Training Director at Anchor Hocking Corporation, Lancaster, Ohio. Gloria has since accepted a position at the Battelle Memorial Institute, Columbus, as Senior Management Development Advisor where she is attempting to apply the same systemic principles to management development in a research institute setting. Gloria maintains an active role in both the American Society for Training and Development (ASTD) and the National Society for Performance and Instruction (NSPI). Gloria received a Ph.D. in Communications from The Ohio State University in 1980.